Proceedings of the Seminar on Responding to the Consequences of Chemical and Biological Terrorism

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Sponsored by the U.S. Public Health Service
Office of Emergency Preparedness
Conducted at
The Uniformed Services University of Health Sciences
4301 Jones Bridge Road
Bethesda, MD USA

- Deployment:
  - Air movement / Baggage (40 medical chests)
  - Coordination

- Mission:
  - Overview
  - Technology
  - Vehicles / Manpower

"The Challenge of Emerging and Re-Emerging Infections"
Joshua Lederberg, The Rockerfeller University

"Outbreak" Novel by Robert Tine

- Deaths by cause: (global basis)
  - Parasitic ~20 million
  - Cardiovascular 13 million
  - Cancer 5 million

- Major factors contributing to the emergence of infectious diseases:
  - Human demographics and behavior
  - Technology and industry
  - economic development and land use
  - International travel and commerce
  - Microbial adaptation and change
  - Breakdown of public health measures

    - Institute of Medicine Report 1992

- The Race:
  HUMAN
  - Evolution
  - Ecological Circumstances
  - Science: Intelligent art

  versus

  THE BUGS
  - Evolution

Genetic Evolution:
Host-parasite co-evolution
Co-adaptation to mutualism or accentuation of virulence?? Jury is still out. (May & Anderson) Many zoonotic convergence. Probably divergent phenomena, with short term flair ups and pyrrhic victories, atop long term trends to co-adaptation

Microbes (bac. fungi. protozoa, viruses)
Intraclonal:
- DNA Replication: may be error prone- in a sea of mutagens
  - Sunlight, chemicals, natural products
- RNA Replication
- Haploid
- Amplification
- Site-directed inversions and transpositions: phase variation
- Other specifically evolved mechanisms
- Genome quadrant duplication silencing

Interclonal:
- Promiscuous recombination
- Conjugation
- Viral Transduction & Lysogenic integration: universal
- Plasmid interchange (by any of above) and integration
- RNA viral reassortment and recombination
- Transgressive - across all boundaries - interkingdom

Technology:
- Vaccines
  - Gross under-investment
  - Vaccination as service to the herd
  - Eventually some insight into safety issues about criteria for human cells lines

- Anti-bacterial Chemotherapy
  - Potentially unlimited capability; bacterial metabolism and genetic structure
- Anti-viral Chemotherapy
  - Much more difficult problem inherently
  - Gross under-investment
  - New approaches: antisense, riboenzymes, targeted D/RNA cleavers

Influenza as a prototype:
- Has periodic outbreaks and accounts from 5-7 % of deaths
  - mostly to elderly and young
- Genetic re-assortment is accountable for rapid shifts in antigen characteristics
- 1918: a variety of influenza that was similar to Hanta-Virus and was probably the result of a particularly virulent strain (SWINE FLU)

- Distinction between Terrorist usable substances and those implicated in natural outbreaks
  - (who would unleash a threat that might come back and disable the terrorist themselves)
  - Usually a cheaply producible, somewhat controllable substance

NIH has identified:
- About 400 viruses that identified as hazardous and need extraordinary precautions
- a couple dozen that require extreme precautions and have caused death or serious illness to a researcher
- Fortunately it requires sufficient sophistication to isolate and culture these viruses so as to make most of these not usable for terrorists

In the year 1346, Caffa was again besieged by the Mongols. During this same time, a vast epidemic of bubonic plague had rapidly spread through the Mongol empire. In the words of Gabriel De Mossie, a contemporary chronicler, "the Tartars, fatigued by such a plague and pestiferous disease, stupefied and amazed, observing themselves dying without hope of health, ordered cadavers placed on their catapults and thrown into the city of Caffa, so that by means of these intolerable messengers, the defenders died widely"